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CULTURAL CONTROL
OF
GRASSHOPPERS
IN ALBERTA

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INTRODUCTION

Since the dawn of history grasshoppers have periodically been one of the major pests with which agriculturists have had to contend and there is every reason to believe that they will continue to be a seriously destructive pest at intervals in the future. In Alberta, grasshoppers have been present in economic numbers for the past fifteen years and it is very desirable that a sound economical method of controlling them be adopted immediately.

HABITS OF GRASSHOPPERS

All of the species of grasshoppers which attack cultivated crops in Alberta lay their eggs in the upper two inches of the soil. The lesser migratory grasshopper, Melanoplus mexicanus mexicanus (Sauss.), lays its eggs throughout cultivated fields; the two-striped grasshopper, M. bivittatus (Say), and the roadside grasshopper, Cammula pellucida (Scud.), lay some of their eggs in the cultivated fields but the majority are laid on the road allowances or in pastures in the case of the latter species.

The grasshoppers commence laying eggs about two weeks after they mature in July and generally continue to do so until the first killing frost occurs in the fall. Thus, large numbers of eggs usually have been laid by the time the farmers have commenced harvesting operations.

Grasshoppers prefer green food. If there are no weeds in the field, there will be little green vegetation for them when they are laying eggs, as the grain usually is ripening by that time. In that case most of them will fly to other fields where green food is to be found. Therefore, it is not only advisable to destroy weeds because of the moisture and plant food which they take from the soil, but also because they serve to hold or attract egg-laying grasshoppers.

METHODS OF CONTROL

There are two methods which farmers use in the control of grasshoppers.

(1) Baiting - The control of grasshoppers by the use of poisoned baits is widely used throughout the Prairies but is not discussed here.

(2) Cultivation - It has not been possible to conduct extensive experiments with cultural control in Alberta but observations made during the last twelve years have indicated that grasshopper populations can be greatly reduced by cultural practices.

To be successful, it is necessary to bring the eggs to the surface of the soil, or close to it, so that they will be destroyed by predators, high temperature and by drying. It is important that the eggs be exposed for as long a time as possible. Exposing them in the fall is preferable but if the cultivation cannot be done until spring the effectiveness of the control will depend on the amount of hot, dry weather that occurs before hatching takes place.

Several types of farm implements are now being used to cultivate the land. Observations have indicated that the one-way disc type of implement is the most satisfactory for grasshopper control under the various existing conditions. When drawn at $4\frac{1}{2}$ m.p.h., or faster, and set to turn the top two inches of soil, this type of implement will do a highly satisfactory job. This shallow "one-waying" should not cover the stubble to any extent unless it is very short, so the practice seldom increases the hazard of soil drifting.

This method of controlling grasshoppers is in accordance with approved soil conservation and weed control methods. As the benefits from weed control usually pay for the operation on most Alberta farms, grasshopper control is thus maintained practically free of cost.

In areas where winter wheat is grown, or cover crops are used to prevent soil drifting, the problem may be somewhat complicated by the green crops attracting the grasshoppers when other vegetation is dry. If the soil where these crops are growing becomes packed, the grasshoppers may lay some eggs there, in which case some baiting may be found to be necessary in the spring. However, it is felt that if all stubble were cultivated every year before the eggs hatched, there would be no dangerous populations to move into these green crops.

Since the two-striped and roadside grasshoppers lay most of their eggs in land that is normally not under cultivation, they

will not be affected by normal cultural practices. Some farmers are disposing of their fences to enable them to cultivate the adjacent road allowances and are thus overcoming this difficulty. Both of these species are of very minor importance at the present time. Should they increase and become an economic problem, cultivation of the fairly restricted egg beds or poisoning the concentrations of young grasshoppers before they have spread to the fields will effectively check them.

CONFIRMATION OF RECOMMENDATIONS

A considerable amount of careful experimental work on cultural control has been done in South Dakota and published in Bulletin No. 379, "Tillage Methods in Grasshopper Control" by Dr. Gerald B. Spawn. The conclusions reached in that State are almost identical with those independently arrived at in Alberta. To quote from that bulletin, "There is very little doubt about the effectiveness of deep moldboard plowing, where it can be used without danger of a soil erosion hazard..... Effectiveness of other methods tended to take the following order: disking (various types), duck-foot type sub-surface cultivation, listing and straight-blade type sub-surface cultivation."

SUMMARY

The cultivation of stubble, particularly by a one-way disc implement, previous to the hatching of the eggs, is the most economical and the most reliable method of preventing an outbreak of the lesser migratory grasshopper in Alberta or of stopping an outbreak of this species after it has started to develop.

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